

DISCHARGES OF PRODUCED WATER TO THE TERRITORIAL SEAS

THE PERMIT PROCESS

- 1.0 An industry-wide study design must be submitted to the LDEQ no later than one month after the effective date of the first O&G-IND permit issued.
- 2.0 The LDEQ will approve or deny the study design no later than five months after receiving the study design.
 - if a study design is approved, facilities may continue to discharge produced water while conducting the study.
 - if no study design is approved, then produced water discharges must cease.
- 3.0 No later than three years after the effective date of the first O&G-IND permit issued, the regulated community will submit a study summary, results, and conclusion evaluating the ecological risk and human health assessment of produced water discharges in the territorial seas environment.
- 4.0 LDEQ will review the results of the study prior to making a decision on the permit renewals.
 - if the study does not support the discharge of produced water, the facility will have 2 years left in the effectiveness of the permit after the submission of the study results to LDEQ to do away with produced water discharges.

PRODUCED WATER STUDY MINIMUM REQUIREMENTS

1.0 Study Objectives

1. Evaluate the bioaccumulation of chemicals associated with produced water discharges to the territorial seas by recreationally- and commercially-important aquatic organisms present at (or near to) discharging and non-discharging platforms;
2. Evaluate the potential health risks associated with the consumption of recreationally- and commercially-important aquatic organisms resident at discharging and non-discharging platforms;
3. Evaluate impacts of produced water discharges to the aquatic ecosystem;
4. Evaluate the areal extent of environmental impact (i.e., sediment toxicity) of produced water discharges; and
5. Characterize produced water effluents based on an expanded list of chemical analytes to allow for an assessment of the adequacy of the current permit requirements and limitations.

2.0 Scope of Work

This scope of work proposes the minimum requirements for an industry-wide study of the environmental effects of produced water discharges in the territorial seas. These requirements will be placed in individual permits authorizing the discharge of produced water and will include a schedule for: 1) industry submission to LDEQ of a study design which incorporates the minimum requirements; 2) LDEQ approval of the study design; 3) study completion; and 4) industry submission of data, results, and conclusions to LDEQ.

As part of the study design, the regulated community may propose the use of existing data for components of the study. The proposal must be consistent with these minimum requirements and provide scientific justification that the data is applicable and relevant to both the territorial seas and that portion of the study.

2.1 *Identification of Discharging Platforms and Characterization of Produced Water Effluents*

A sufficient number of discharging platforms should be included in the study to ensure that all types of oceanographic environments within the territorial seas are addressed. Discharging platforms should be identified for each critical dilution water depth category addressed in the current permit (< 2 m, 2-4 m, 4-6 m, 6-9 m, and >9 m). Water depth is defined as the water depth between the discharge pipe and the seafloor or between the surface and the seafloor if the discharge is made above the water's surface.

Utilizing variables such as the chemical content and discharge rate/volume of the effluent, method of discharge, depth of water, distance from shoreline, and water flow, each discharging platform should be ranked with regard to the potential for the discharge of produced water to result in: 1) environmental impacts (including aquatic toxicity); and 2) the bioaccumulation of discharge-related chemicals by recreationally- and commercially-important species. The discharging platforms potentially posing the greatest environmental and bioaccumulation risks should be selected for further assessment as described in Sections 2.2, 2.3, 2.4, and 2.5. Sufficient scientific evidence should be provided to support the ranking and selection of platforms for further assessment.

For each discharging platform selected for further assessment, a non-discharging platform should be identified based on similarities in discharge volumes and surface water environment variables such as method of discharge, depth of water, distance from shoreline, and water flow. Non-discharging platforms should be included in the study to characterize background environmental conditions in the territorial seas and support data interpretation.

In addition to identifying platforms requiring further assessment, data on the chemical content and discharge rate/volume of the effluent will be used to support permitting decisions regarding the need for additional monitoring parameters, an increased frequency of toxicity testing, additional biomonitoring requirements, and/or the placement of limitations on discharge volumes.

2.2 *Characterization of Environmental Impact*

Sediment chemistry data should be obtained to delineate the horizontal extent of chemicals of concern (COC) in the biogenic layer. Discrete sediment samples should be obtained outside of the mixing zone (i.e., >400 ft from the discharge point) for each discharging and non-discharging platform and submitted for chemical analysis. Ancillary data such as total organic compounds (TOC) should be collected as needed for allow for data interpretation.

2.3 *Assessment of Bioaccumulation*

The edible tissue of three species of marine organisms should be monitored for the pollutants specified in Section 3.0. The organisms sampled should include one species of mollusc, one species of crustacea, and one species of nektonic fish. The species sampled should be from the following list:

Crustacea	Mollusc	Nekontic Fish
Blue crab	Eastern oyster	Atlantic croaker
Stone crab	Clam species	Snapper species
Shrimp species	Shrimp species	Grouper species

Five adults should be sampled from each species. Sampling should be conducted twice per year, once during the summer months (June through August) and once during the winter months (December through February). Samples should be collected 400 feet down current, from the point of discharge, at the time of discharge of produced water. Tissue residue data should also be obtained for oysters present in harvesting areas or active oyster leases nearest to a discharging and non-discharging platform pair.

Tissue residues of species sampled at discharging platforms should be compared to tissues residues of like species sampled at non-discharging platforms to provide characterization of background tissue residues in the territorial seas.

2.4 *Assessment of Human Health Risks*

The tissue residue data should be used to quantitatively assess the potential human health risks associated with the consumption of fish obtained from platforms in the territorial seas. Potential human health risks should be estimated separately for both the discharging and non-discharging platforms. The health risk assessment approach and assumptions should be consistent with *Protocol for Issuing Public Health*

Advisories for Chemical Contaminants in Recreationally Caught Fish and Shellfish (LDHH, LDEQ, LDWF, and LDAF 2011).

2.5 Assessment of Ecological Effects

The sediment chemistry data for the biogenic layer (discussed in Section 2.2) should be screened against published effects-based sediment quality criteria (SQC) to provide an assessment of local impacts to benthic invertebrates and aquatic organisms residing adjacent to the platform.

Sediment toxicity testing should be conducted to evaluate chronic toxicity, growth, and reproduction of aquatic organisms. Testing should be conducted in accordance with current EPA guidelines and should address more than one test species to provide additional lines of evidence to support data interpretation and the permitting process. Sediment samples for toxicity testing should be collected at multiple locations at varying distances along a transect that extends from approximately >400 ft (outside of the mixing zone) to 6500 ft (background conditions) from the discharge point. Co-location of samples collected for sediment toxicity testing with sediment samples collected for chemical analysis is recommended.

The sediment chemistry data and sediment toxicity testing for non-discharging platforms should serve to establish background conditions for the territorial seas to support data interpretation.

3.0 Sampling and Analysis Protocols

The collection of sediment samples for chemical analysis and toxicity testing should be conducted in accordance with current EPA guidelines.

Biota samples should be collected in accordance with the *Protocol for Issuing Public Health Advisories for Chemical Contaminants in Recreationally Caught Fish and Shellfish* (LDHH, LDEQ, LDWF, LDAF 2011).

The analyte list: for the analysis of produced waters, sediment, and tissue should include the chemicals of concern (COC) known to be associated with produced waters. These COC include:

Petroleum Hydrocarbons C ₆ – C ₃₅	EPA SW846 Method 8015 or Texas Method 1006
Volatile Organic Chemicals	benzene, toluene, ethylbenzene, xylene
Semivolatile Organic Chemicals	naphthalene, fluorene, anthracene, phenanthrene, fluoranthene, pyrene, benz[a]anthracene, chrysene, benzo[b]fluoroanthene,

	benzo[k]fluoranthene, benzo[a]pyrene, indeno[1,2,3-cd]pyrene, dibenzo[a,h]anthracene, C1-naphthalenes, C2-naphthalenes, C3-naphthalenes, C4-naphthalenes, C1-fluorenes, C2-fluorenes, C1-phenanthrene/anthracene, C2-phenanthrene/anthracene, C3-phenanthrene/anthracene, C4-phenanthrene/anthracene, and total phenol
Metals	lead, thallium, arsenic, barium, cadmium, mercury, chromium, copper, zinc, vanadium, and nickel
NORM	radium-226 and radium-228

The data quality objectives should be identified for each medium and receptor of concern and should address issues relevant to the assessment of bioaccumulation, human health risks, and ecological risks.